6.1   **I can graph polynomial functions and demonstrate understanding of the significant features of its graph and their relationship to real-world solutions.**

NO CALCULATOR!!!

Level 1:

1. Sketch the end behavior of the functions:
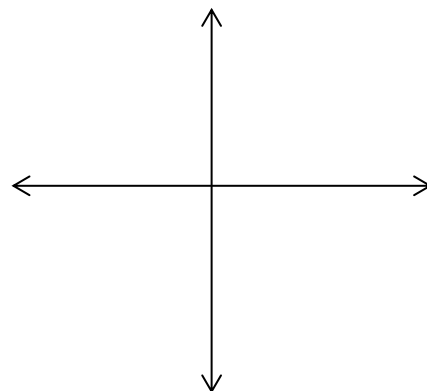   a. $f(x) = -2x^4 + 3x - 1$

   b. $f(x) = -.5x^3 + 4x^2 - x - 5$

   c. $f(x) = ax^3 + bx^2 + cx + d$ where a > 1

Identify the significant features of the polynomial functions and use them to sketch their graph:

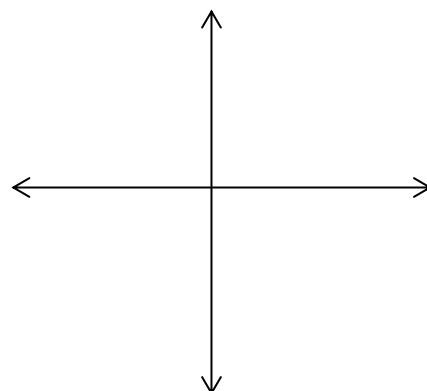2. $f(x) = -2x(x + 4)(x - 5)$

   a. End behavior sketch:

   b. x-intercepts and their multiplicity:
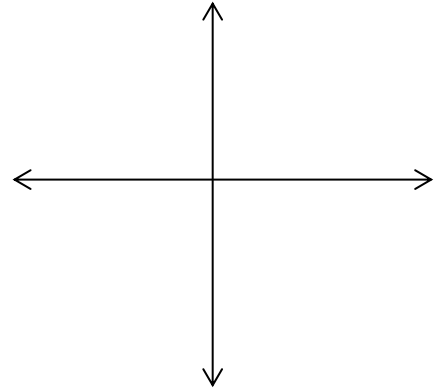

3. $f(x) = (x + 3)^2(x - 5)^2$

   a. End behavior sketch:

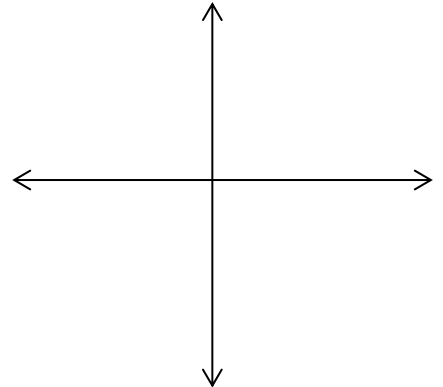   b. x-intercepts and their multiplicity:

Level 2/3:

4. Graph the cubic function and identify the features of the graph: $f(x) = x^3 + 5x^2 - 9x - 45$ given x = 3 is
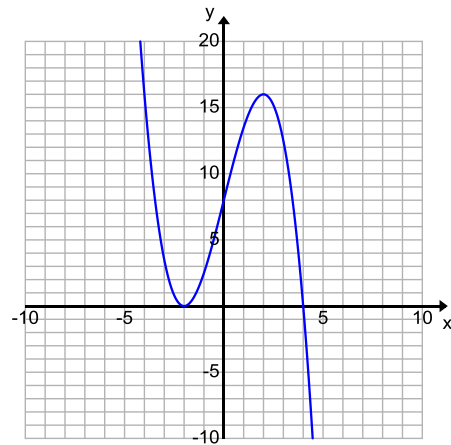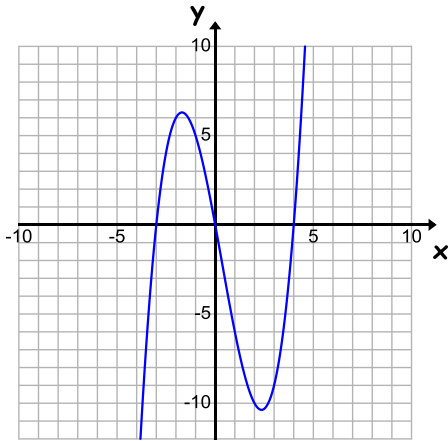   a zero.

5. Sketch a graph that meets the following requirements:
    - Zeros at x = -2 , 3, and 6
    - Zeros -2 and 3 have multiplicity 1 and 6 has a multiplicity of 2
    - Negative leading coefficient
    - Y-intercept at (0, 5)

6. Write an equation in standard form – assume the leading coefficient is 1 or -1. Make sure to match the end behavior with your equation.

6.3   *I can demonstrate understanding of how to solve polynomial equations.*

Level 1

7. Find all of the roots of the function $f(x) = x^3 - 5x^2 - 2x + 24$ given x = -2 is a zero.

8. Find the roots of the polynomial given that f(2)=0.

$$f(x) = x^3 + 5x^2 - 4x - 20$$

9. Find all the zeros of the polynomial given that $(x + 6)$ is a factor.

$$f(x) = 2x^3 + 7x^2 - 33x - 18$$

Level 2/3:

10. Find all roots of the polynomial:

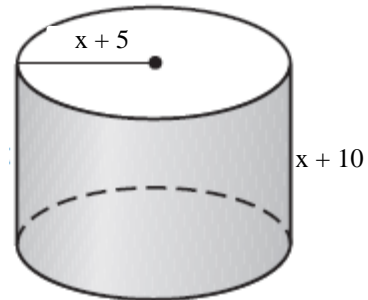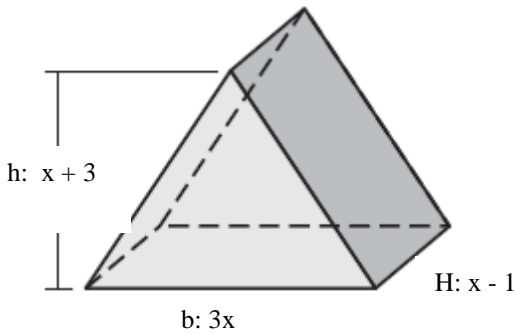$$f(x) = x^3 + 2x^2 - 17x - 10$$

11. Find all of the zeros of the polynomial:

$$f(x) = x^3 - 2x^2 + 16x - 32$$

Show all work! Write and solve a polynomial equation to find the dimensions of the solid with the given volume.
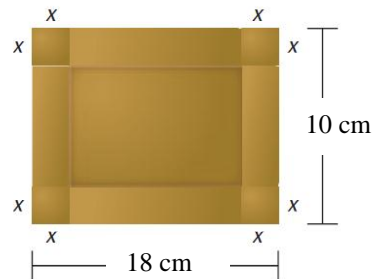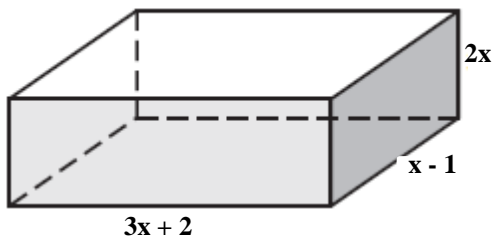
12.   Volume = 54 ft^3

$V = \frac{1}{2} \cdot b \cdot h \cdot H$

h: x + 3

b: 3x

H: x - 1

13.   Volume = 72π m^3

$V = \pi r^2 h$

x + 5

x + 10

14.   Volume = 336 in^3

2x

x - 1

3x + 2

15.Find the maximum volume and the value of x that would give the maximum volume.

x   x
x   x

10 cm

x   x
x   x

18 cm

16.   Find the maximum volume and the value of x that would give the max volume.

x   x
x   x

5 in

x   x
x   x

11 in

17.   Find the maximum volume and the value of x that would give the max volume.

x   x
x   x

4 in

x   x
x   x

6 in